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## LAMPREYS IN CAPTIVITY.

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HAVING had living lampreys of various ages under observation in the biological laboratory of Johns Hopkins University, I present the following facts as to the ability of these animals to live in a very limited space.

I received, about the middle of May, from Ithaca, N. Y., two lots of lamprey eggs, about six dozen eggs in each lot. They were shipped by express and must have been on the road about twenty to twenty-four hours. They had been shoveled out of the "nest," with about 2 l. of gravel, and put into two tin buckets of 8 l. capacity. The space in the buckets above the gravel was filled with water, and in one of the buckets were some three dozen larval lampreys ranging from 2 cm. to 12 cm. in length. None of these eggs developed, although they were put into running water as soon as they reached the laboratory.

My experience with the small larvae (about 5 mm. in length) was more successful. I obtained one hundred or more of these from a stream at Ithaca, and brought them to Baltimore in two glass jars of 3-4 l. capacity each. A small quantity of gravel was placed in the bottom of each jar for the larvae to bury themselves in, and the water was kept cool by partially emptying the jars from time to time, and refilling them with ice water from the coolers on the train. The journey lasted for about eighteen hours, and all the larvae, except three or four, reached the laboratory in good condition.

The small amount of sediment in the city water proving disastrous to the welfare of the larvae, clear spring water was obtained every few days, and this was kept cool by allowing the jars to stand in larger vessels of running water. Even with this arrangement the deaths averaged one per day, and about the first of August the remaining larvae were killed and

preserved, after having, with difficulty, been kept alive for six weeks.

The older larvae which were received, as has been said, in one of the buckets containing eggs, proved to be very hardy, and five or six of them were kept in a 12 l. aquarium for six months or more without the least difficulty. At the end of this time they were killed, two of them having shortly before (October 20) transformed into the adult *Petromyzon branchialis*. During their entire captivity they remained completely buried in the sand in the aquarium. A small stream of water was kept running through the aquarium, though a *constant* change of water was not necessary.

In the early part of April, I brought from the herring fisheries at Port Deposit, Md., five large sea lampreys (*P. marinus*) in two tin buckets, each bucket of about 50 l. capacity. Being nearly a meter in length and about 12 cm. in circumference, the five lampreys were rather crowded in the two buckets, and only four of them survived the three-hour journey to the laboratory. They were put into an aquarium (1.5 m.  $\times$  .8 m.  $\times$  12 cm.) of running water, where they lived comfortably for several weeks, until by accident the wire screen was left off the aquarium, and three of them escaped and were found dead upon the floor. On June 22 the remaining lamprey was killed. It proved to be a female, and 250 cc. of ripe ova were "stripped" from her with ease. Had one of the males been kept alive it seems probable that artificial fertilization could easily have been accomplished.

To sum up, then, it seems (1) that the very small larvae are very delicate and hard to keep in confinement; (2) that the large larvae are unusually hardy; and (3) that the adults are able to live in captivity moderately well.